

# Some Accessories for the HB-1A QRP Rig

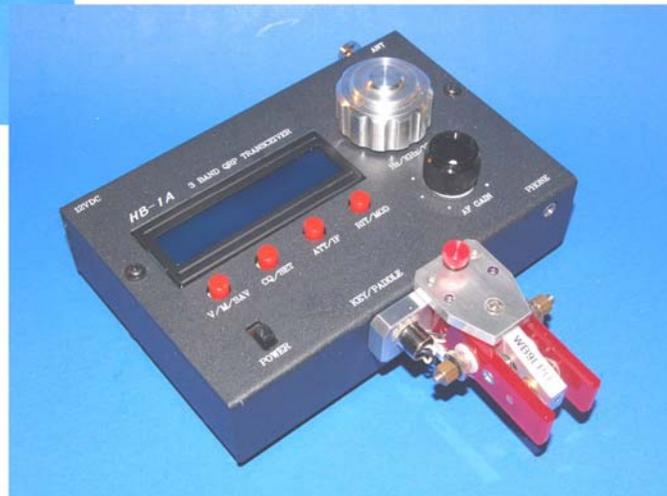
by

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The HB-1A, Original

The HB-1A, with Modifications



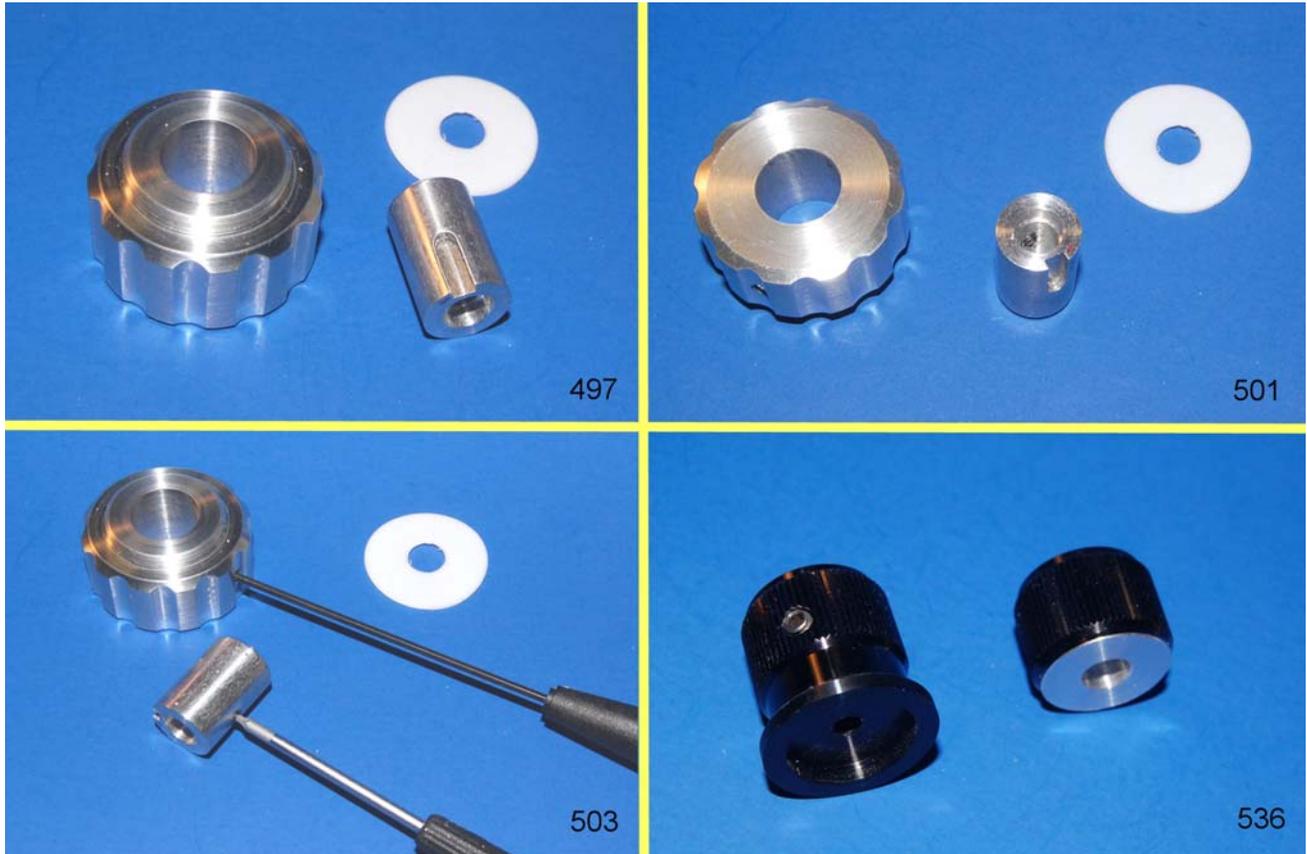
A new addition to the available selection of field-ready QRP rigs has recently become available. The “early adopters” of the HB-1A have found it to be a very good performer, with a lot of easily accessible features and operating modes. WA6L has contributed a good review of the rig in the Summer 2009 issue of the QRP Quarterly, and it has been reviewed on eHam as well. Right out of the box it is a good performer, but since I can’t seem to leave well enough alone, I have made a couple of changes that have enhanced its ease of operation.

## A New Tuning Knob for the HB-1A

The rig uses a rotary encoder to control its DDS VFO. Rotating the tuning knob steps the frequency up and down (and addresses the 20 memory locations). Pressing the knob downward changes the amount that the frequency steps for each “click” of the knob. But because a knob for a ¼” shaft is used with a slightly smaller encoder shaft, there is a little

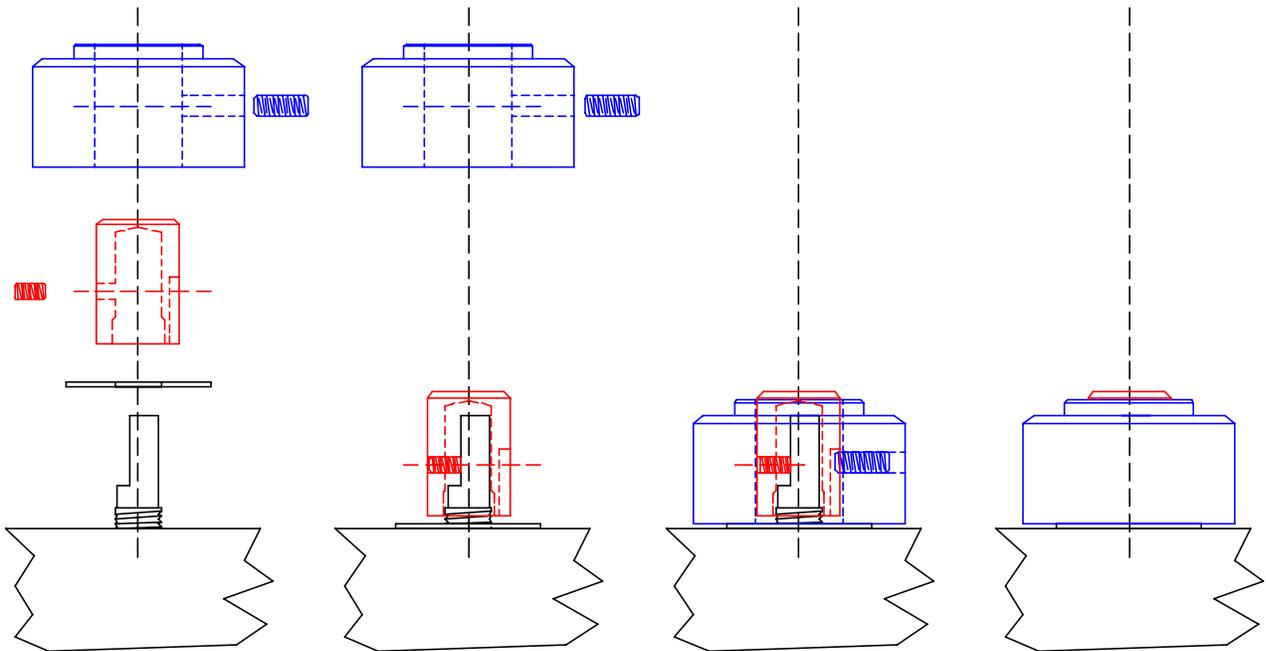
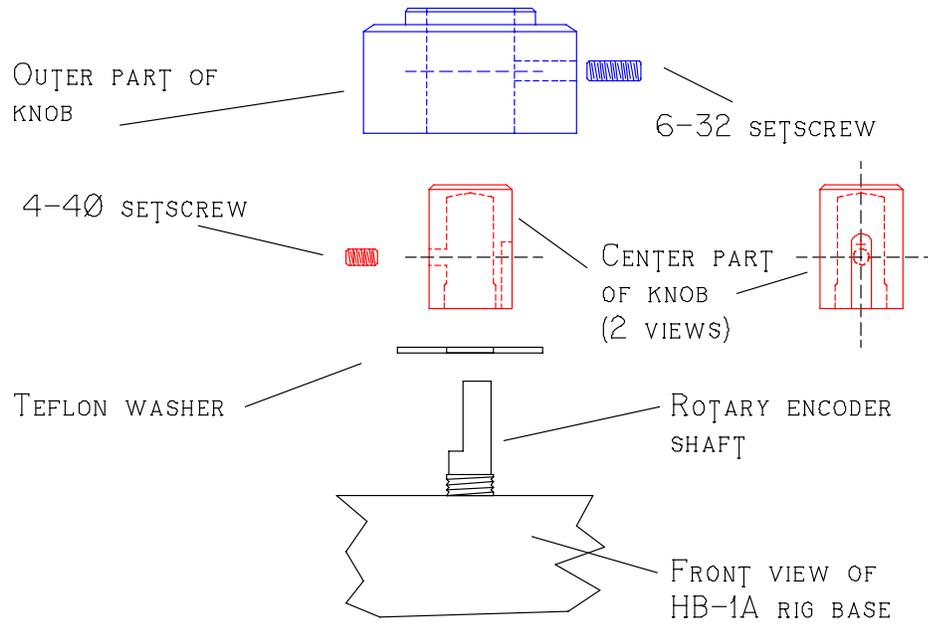
“wobble” as the knob is turned. I also feel that pressing the entire knob down (especially when pressure is applied to the outer rim) subjects the shaft to a little more stress than I would like. (I know, I worry too much.) So I undertook the design of a knob that would get around these objections. Its use requires no physical changes to the transceiver.

The picture below shows the parts of the knob assembly. The parts are machined



from 6061 aircraft aluminum and Teflon. The knob assembly is composed of an outer portion (**upper left**) about 1-1/4” in diameter, and a center portion 1/2” in diameter. A Teflon washer provides a lower operating surface. The lower surfaces of these parts are shown at the **upper right**. The center hole in the outer knob is bored out 0.001” oversize for a slip fit to the center portion, which has a 1/8” channel milled partway up its side. The center portion (**lower left**) is held to the encoder shaft with a 4-40 setscrew, while a 6-32 setscrew in the outer portion engages the milled channel and causes the center part to turn with the outer part but allows it to move up and down independently. The volume control knob also had a slight mismatch in shaft diameter, so a commercial aluminum knob was turned down and bored out to mate properly with the audio shaft (**lower right**).

Drawings of these parts and their assembly are shown on the next page.



ALL KNOB PARTS,  
READY FOR ASSEMBLY

TEFLON WASHER OVER  
SHAFT.  
KNOB CENTER FIXED  
WITH 4-40 SETSCREW.  
SMALL GAP BETWEEN  
KNOB AND WASHER.

OUTER PART OF KNOB  
FLUSH AGAINST WASHER.  
HELD CAPTIVE WITH  
6-32 SETSCREW.  
(DO NOT TIGHTEN.)

ASSEMBLED KNOB.  
PRESS CENTER TO  
ACTIVATE SWITCH,  
TURN OUTER FOR  
FREQUENCY CHANGE.

The steps in installing the tuning knob are shown in the next set of photos. Start by removing the two knobs (with a flat-bladed screwdriver) as shown at the **upper left**. Now



place the appropriate Teflon washer over each shaft (**upper center**). Slip the center portion of the knob assembly over shaft, orienting it so that the setscrew will press against the flat side of the shaft. The 4-40 setscrew requires a 0.050" hex driver. Adjust the location of the knob center so that the shaft can be pressed down until it clicks positively, and tighten the setscrew (**upper right**). Rotate the knob center so that the milled channel is facing you (**lower left**), and slip the outer portion of the knob over it, turning it so that the 6-32 setscrew will engage the milled channel without actually pressing against the center portion itself (**lower center**). Test for this by pressing the center portion. It should click up and down without any interference, and the outer portion should be resting on the Teflon washer (whose function is to provide a "slippery" surface. While it is not necessary, a bit of Loctite will keep the screw from changing its adjustment. The installed knob, along with the new audio gain knob, are shown at the **lower right**.

In operation, the frequency is changed by rotating the outer portion of the knob, while the step-size is adjusted by pressing the center portion of the knob. The 6-32 setscrew in the outer portion of the knob also keeps it from falling off. Because the rig was designed to be used in a horizontal position, a little play has been allowed in the anchoring of the outer portion of the knob. This can be adjusted out by slightly by shifting the up or down position of the center portion of the knob.

## An Attached Iambic Paddle for the HB-1A

A handy accessory for a trail-friendly radio is an attached paddle that eliminates the need for a cable and a stand-alone paddle. My website (<http://wb9lpu.googlepages.com>) show such paddles for the Elecraft KX-1 and for the Hendricks PFR rig. Both of these radios have fixtures for the mounting of these paddles, but the HB-1A. While a clamping arrangement or a magnetic mount could be considered, I chose to make a minor modification of the rig that would allow it to use the paddle originally designed for the PFR-3. This involved the drilling of one hole in the front of the rig and using a screw to secure a mounting fixture.

As it turns out, the rig was easily removed from its case. It involved removing a nut and screw holding the output transistor against the rear of the case. The output BNC connector was unsoldered from the circuit board and the front-panel knobs removed. The board was then free to be removed from the case. To hold the paddle-mounting fixture (a knurled nut), a #33 hole was drilled at the appropriate location and a pan-head 4-40 screw was used to hold the knurled nut. Fortunately, there are no components on the circuit board that would be interfered with by the screw head. The rig went back together without difficulty, and the paddle fit nicely. See the photo sequence below –



**Upper left:** The new mounting fixture on the front lip of the rig. **Upper center:** The key is ready to plug into the panel jack. **Upper right:** The key is plugged in, but not yet secured to the fixture. **Lower left:** The key is plugged in and is secured by the red knob on its top, which engages with the mounting fixture. **Lower center:** The paddle in use with the HB-1A. **Lower right:** A small bug in use, connected in the conventional manner.

These are some changes that added a little operating convenience to the HB-1A QRP rig. They involve no changes to the circuitry, and only one modest modification to the case of the rig. Now it's time to quit fiddling around with the rig and make some more contacts, sunspots or not.

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